United States Environmental Protection Agency
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Mr. Ed Boyle
DoN, Northern Division - NAVFAC
10 Industrial Highway
Code 1811/EB - Mail Stop 82
Lester, PA 19113-2090

Re: *Responses to EPA's Comments to the Draft Phase I Remedial Investigation Report of IR Program Site 16, Volumes 1 and 2, Draft Human Health Risk Assessment at IR Program Site 16 (Creosote Dip Tank and Fire Fighting Training Area),* and *Draft Screening Level Ecological Risk Assessment at IR Program Site 16 (Creosote Dip Tank and Fire Fighting Training Area),* all dated January 2002, at the former Naval Construction Battalion Center (NCBC) Davisville, RI

Dear Mr. Boyle:

Pursuant to § 7.6 of the Davisville Naval Construction Battalion Center Federal Facility Agreement dated March 23, 1992, as amended (FFA), the Environmental Protection Agency has reviewed the subject document.

In regard to the many occurrences of the phrase, "the interpretations, speculations, and opinions of EPA are noted", EPA's comments are offered in response to and at a level commensurate with the information supplied. Any divergence of hypotheses simply reflects the poor current level of understanding of this complex site and indicates a need for additional data collection. It is therefore incumbent on the Navy, as the lead agency, to provide additional data which can support a technically-defensible understanding of the site. EPA looks forward to reviewing the Navy's work plan to address the identified data gaps and to working together to reach consensus on the issues noted in the subject responses so that we may move expeditiously towards remedy selection for this site.

If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

Christine A.P. Williams, RPM
Federal Facilities Superfund Section

Enclosures

cc: Richard Gottlieb, RIDEM
Dave Barney, CSO
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EPA COMMENTS ON THE SITE 16 RI RTC

GENERAL COMMENTS

Comment 2.1: With respect to the additional comment that "localized areas of relatively fast ground-water velocity can only have effectively flushing action if the water has somewhere to go...," the information contained in the report (hydraulic gradient, conductivity values, and non-existent organic matter in the deep wells and/or bedrock) suggests that the groundwater does have "somewhere to go". It is also the Navy that is stating that groundwater and contaminants appear to be migrating from Building 41 to the northeast along a preferential pathway. If there is an interpretation that contamination has migrated from Building 41 and "stopped" or markedly slowed after reaching the vicinity of point of blockage or retardation it should be discussed and documented.

SPECIFIC COMMENTS

Comment 3: *Comment not addressed.* Based upon the data presented in the Site 16 Phase I Remedial Investigation Report, while some component of groundwater flow from Building E-319 likely flows toward Narragansett Bay it is not entirely clear where local groundwater flows in the area southeast of Building 41. Also, it is noted that while the shallow groundwater flow is stated to be toward Narragansett Bay, the bedrock groundwater flow direction presented in the Phase I Remedial Investigation is to the northeast along an interpreted bedrock trough. Extension of this deep groundwater flow could be traced directly up gradient to Building E-319. If the contaminants originated as a dense, non-aqueous phase liquid (DNAPL) it is very possible that contaminants could also have migrated to depth from the location of Building E-319 and from there, along the inferred bedrock trough to the northeast. Therefore, further evaluation of the vicinity of Building E-319 is warranted.

Comment 6: *Comment not addressed.* The proposed additional work will be reviewed in detail when the Site 16 Phase II Work Plan is received. This issue, however, is still unresolved, largely in part due to data gaps or "silence in the data." That "silence in the data" is due to its' absence at key locations, in particular, a lack of shallow, intermediate, deep, and bedrock groundwater monitoring wells within the Site 16 area. The Navy may be correct in their "interpretations, speculations and opinions." However, at the present time, there is insufficient data in key areas to support the Navy's "hypothesis."

It should also be noted that while high levels of CVOCs were not detected in MW16-03D, this well is not in rock. However, even if it were, due to nature of groundwater flow in fractured rock, it is possible that any one particular rock well could miss overall bedrock groundwater contamination.

EPA's concern is that contaminants may have migrated downward into the weathered and/or fractured bedrock from releases within the central area of Site 16, including the fill material, the

Encl 1

Former Fire Training Area, or other historic operational activities to the southeast. As indicated in EPA's comments, there is a concern that CVOCs have migrated to the east and southeast within the Site 16 area, where there is a paucity of shallow, intermediate and deep groundwater monitoring data.

In particular, EPA would again call attention to the available data collected by the Navy in this vicinity. The soil boring log for MW16-02, one of the wells stated to be along the preferential pathway from Building 41 with elevated CVOCs in the bedrock (MW16-02R) and the overlying deep well (MW16-02D) had PID readings from 18 feet below the ground surface to a depth of 68 feet. The readings generally increase with depth suggesting a historic surface release in the central or southeast area of Site 16.

Comment 10: EPA takes issue with the statement of any attempt to estimate past hydrogeological regime using "gross assumptions" with output being no more than "speculation." Investigative analysis and problem solving often requires initial "gross assumptions" in order to attempt to understand and fully evaluate the observed data, (sometimes known as an "initial hypotheses"). This is especially critical where there are apparent data gaps. EPA believes that 8 to 9 acres is not an insignificant area. Hydraulic loading can result in periodic mounding especially when the surface is permeable, free of vegetation and also is subject to additional hydraulic loads as occurs when water is applied to the ground surface to fight fires.

Comment 12: EPA takes issue with the editorial statement that "This appears to be a hypothesis based upon the silence in the data." The RQD value is real.

Comment 14: EPA's reference to a data gap relates to the Navy's "hypothesis" that contaminated groundwater originates from Building 41 and extends migrates to the northeast. If that is the case, additional data is necessary to show that deep groundwater does not continue to flow to the southeast, as the Navy states that it does from Building E-319. To that extent, EPA believes there is a data gap. Although additional data may clarify the situation, the presently available data drives the excessive amount of non-constrained "hypotheses" on both parts.

Comment 16: *Comment not addressed.* It is assumed that the aquifer may be heterogeneous. However, how do the hydraulic conductivity values relate to various stratigraphic sequences and/or locations?

Comment 21: It is acknowledged that the data does not indicate the presence of DNAPL. However, that was not the point of the comment. The comment reflects the concern over an absence of data within the central Site 16 area, especially to the east and southeast in regards to shallow, intermediate and deep groundwater monitoring wells. The proposed locations of any soil borings, monitoring wells, and/or piezometers will be evaluated during review of the Site 16

EPA COMMENTS ON THE SITE 16 RI RTC

Phase II Work Plan.

Comment 23: EPA is concerned that the methods used to test the soils at the MW16-07 location did not target the contamination. During the Phase II RI, EPA requests the navy use a different method to determine what type of contamination the high PID hits from the boring logs and MIP logs was. Method 9071B, as proposed in the Building 41 subsurface investigation, would be acceptable.

Comment 24: The statement that the contamination in deep groundwater "appears to be overshadowed by the deep CVOC plume that appears to have migrated northeast from beneath Building 41" is, as the Navy has described many of EPA's interpretations, only "speculation," "opinion," and a "hypothesis." It may not be supportable due to an absence of data within the Site 16 Stage I area, beneath Building 41, the RR yard, and Building E-319.

Comment 30: *Comment partially addressed.* It is EPA's opinion that the additional work proposed for the Site 16 Phase II Remedial Investigation would not appear to resolve this issue. In particular, MW16-26D, while apparently hydraulically up gradient from the Site 16 area, is also apparently down dip of the silt layer presented on Cross Section A-A'. The fill unit shown on the Cross Section lies at the top of this unit. In the absence of groundwater quality data for the shallow or intermediate zones at the MW16-26D location it is not possible to ascertain whether contaminants released in that vicinity have migrated down dip along the silt lens. However, the proposed locations of any soil borings, monitoring wells, and/or piezometers will be evaluated during review of the Site 16 Phase II Work Plan.

Comment 31: *Comment partially addressed.* See Comment 30 above. Also, in regard to shallow wells, there is an absence of water table elevation data in a large segment of the eastern half of the Site 16 central area. A shallow well at the location of MW16-29 still appears to be warranted since the Navy has not determined the nature and extent of the screening hits at locations MIP-26 and E-1.

Comment 32: *Comment partially addressed.* At the present time, the shallow groundwater flow pattern is unresolved. It may, as the Navy has interpreted on Figure 3-10, be entirely to the northeast. However, elsewhere in these responses to comments, the Navy states that the Stone and Webster work indicates shallow groundwater from the vicinity of Building E-319 flowing to the southeast. A concern that EPA has, especially in view of the available MIP and PID data and the lack of local shallow groundwater elevation data to the east and southeast of Building 41, is that the location of the groundwater divide between northeast and southeast groundwater flow is not known. Water table elevation data at the location of MW16-08 and other locations is considered important in helping to resolve this issue.

Comment 33: *Comment partially addressed.* See Comment 32, above. EPA does not concur

that shallow wells are not necessary at the locations noted. A review of Table 1 and Figure A does not indicate any planned shallow groundwater monitoring or observation wells in the area east of Building 41.

Comment 34: *Comment partially addressed.* See Comment 33 above.

Comment 35: *Comment partially addressed.* See Comment 33, above. EPA does not concur that shallow wells are not necessary at the locations noted.

Comment 36: *Comment not addressed.* EPA would suggest that historical uses of the site that could have contributed arsenic are the fill material that is documented on the site soil boring logs and cross sections, and the creosote or wood preserving areas. According to the Pollution Prevention and Abatement Handbook, World Bank Group, July 1998: "The largest contributions of arsenic in terrestrial water are ***landfills***, mines, pit heaps, wastewater from smelters, and ***arsenic containing wood preservatives.***" Landfills, even small ones, contain a variety of materials that contribute arsenic to ground and surface waters, including coal ash, or waste pesticides and herbicides, incinerated preserved wood, etc. The site fill material appears to contain material not classified as "clean fill." Additionally, arsenic was a common constituent of pesticides and herbicides that could have been used in the past and applied generally in the area.

RIDEM - RI - Comment 1: *Comment not addressed.* This comment is in regard to the issue of elevated reporting limits for Vinyl Chloride and 1,1- Dichloroethane (see response to RIDEM comment #1). The compounds that appear to be the cause of the problem are those that are typically considered to be field and lab contaminants. If acetone and methylene chloride are not contaminants of concern at this site, then corrective action needs to be initiated in the field and/or the lab to minimize the level of contamination. Once the problem has been corrected, then the samples need to be resampled and reanalyzed to try and report these compounds with reporting limits below the RIDEM residential direct exposure criteria.

Responses to Comments on the Human Health Risk Assessment for Site 16

New EPA comment: During EPA's first review of the draft human health risk assessment, we did not notice that there was no description of the dust inhalation parameters in the text at Section 2.2.4.1. Similarly, we did not notice that there was no description of the method used to calculate the concentration of contaminants in dust, presumably based on the soil concentration. Please provide these descriptions in the final draft.

General Comments

3. The original comment questioned the selection of both cis- and total 1,2-DCE as COPCs. The response indicates that text will be added to clarify method discrepancies and the conservative treatment of the data in the HHRA. The explanation should include a comparison of the laboratory reporting limits of these compounds and their affect on the calculation of the arithmetic averages and exposure point concentration calculations.

4. The original comment addressed the elimination of contaminants of potential concern at the initial stage of the HHRA using a background screening procedure. The response to this comment indicates that the HHRA work plan included this procedure; however, the Navy has previously been informed of the EPA's position regarding this procedure during the review of both the draft work plan and the Response to Comments package. The EPA clearly indicated that the background screening procedure utilized at the initial stage of the HHRA is unacceptable. This issue has not been resolved.

   However, given the pending reconciliation of the arsenic data, as requested, elimination of arsenic as a COPC based on a low frequency of detection is appropriate.

5. Navy declines to assess risks of seep sediment and seep water to a recreational receptor based on the fact that this pathway was not included in the final work plan. A recreational exposure pathway to seep sediment and seep water is considered to be reasonably foreseeable under future scenarios in which the public has access to these areas. In the absence of a risk evaluation to the contrary, EPA believes that there may be a risk to a future recreational receptor. Therefore, EPA is requesting this type of assessment as part of the Phase II RI. We are also requesting additional sediment samples to look for lateral contaminant concentration trends along the shorelines.

6. Navy declines to evaluate the potential risks of VOC migration into indoor air because VOCs were detected only in deep wells, not shallow wells. Although vinyl chloride was found in only one shallow monitoring well (MW16-04S) at 0.9 ug/l, vinyl chloride was found at concentrations up to 14 ug/l in two rounds of direct push groundwater sampling. Since EPA believes that the past direct push data show a significant potential for migration and risk of vinyl chloride into the indoor air of future buildings and the future shallow well data will also indicate the presence of vinyl chloride, EPA is requesting

Encl 2

modeling of indoor air concentrations and risk as part of the Phase II RI.

7. Navy declines to recalculate groundwater exposure point concentrations according to EPA Region I guidance because the procedure was presented in the final work plan. The procedure in the final work plan (p.16 of final work plan) is the same as that requested by EPA in its comment. The final work plan states:

"Consistent with U. S. EPA, the 95% UCLM will be used as the RME chemical concentration estimate for all matrices with the exception of ground water. Ground water RME exposure estimates will be based on the maximum concentration detected in wells. If multiple sample rounds are available for the well with maximum chemical concentrations, an average of all the rounds will be used as the ground-water RME exposure estimate."

The final work plan does not specify which type of exposure point concentration will be used for the CTE scenario. EPA Region I guidance (Risk Update No. 3, page 5, 1995) is as follows:

"As described in the August, 1994 Risk Updates, exposure point concentrations (EPCs) should be based on the 95 percent upper confidence limit (UCL) on the arithmetic mean for all media except groundwater. For groundwater, EPCs should be based on the arithmetic mean and maximum chemical concentrations. To evaluate central tendency exposures, combine the arithmetic mean with the central tendency parameters. High end exposures should be assessed by combining the maximum concentrations with high end exposure parameters."

It appears that the Navy has calculated CTE risks using average soil and average groundwater concentrations as the EPC, combined with CTE exposure parameters. It also appears that the Navy has calculated RME risks of soil using 95% UCLM soil concentrations and RME risks of groundwater using the 95% UCLM (or maximum) groundwater concentration.

EPA interprets its guidance to mean that the EPC for <u>both</u> the CTE and RME **for all media except groundwater** should be the 95% UCLM unless it is greater than the maximum, in which case the EPC should be the maximum concentration. **For groundwater**, EPA Region I interprets its guidance to mean that the EPC for <u>both</u> the CTE and RME should be the maximum concentration, unless there are multiple rounds of analyses, in which case the EPC for groundwater should be the average concentration of multiple rounds in the well with the highest concentrations.

It appears that the Navy interpreted this guidance differently, using the average

groundwater concentrations and average soil concentrations for the CTE, and the 95% UCLM for both groundwater and soil as the RME. The result is that the calculated CTE risks are lower than they should be (Navy used average soil and groundwater concentrations, rather than upper end concentrations), and that the calculated RME risks of groundwater are lower than they should be (Navy used 95% UCLM groundwater concentrations, rather than maximum concentrations). The Navy correctly used the 95% UCLM (or maximum) as the RME for soil, in accordance with the EPA Region I interpretation.

Since remedial decisions are based on the RME risks, there is no need to recalculate the CTE except for completeness. However, remedial decisions should not be modified based on the CTE risks in the draft document because they are lower than they should have been. The RME risks of soil are calculated correctly. Since the Navy should have used the maximum groundwater concentration (as stated in the work plan), rather than the 95% UCLM, for the RME risks of groundwater, the groundwater risks should be recalculated and the text revised. It is acknowledged that this recalculation will not change the conclusion that groundwater risks exceed EPA risk limits. However, it may change some conclusions concerning cumulative risk for those receptors that have both soil and groundwater exposures. In addition, recalculation of RME groundwater risks will help to ensure that the PRGs are calculated correctly for the FS. For clarity at this site, the correct method for calculating EPCs is provided in the table below:

Medium	EPC for the CTE	EPC for the RME
Soil	95% UCLM, unless it is greater than the maximum, in which case use the maximum	95% UCLM, unless it is greater than the maximum, in which case use the maximum
Groundwater	Maximum, unless there are multiple rounds, in which case use the average concentration in the well with the highest concentration	Maximum, unless there are multiple rounds, in which case use the average concentration in the well with the highest concentration

Specific Comments

10. **Page 2-21, 2-22, Sections 2.5.6.1 and 2.5.6.2:** The response to the original comment indicates that the text will be modified to reflect the appropriate levels. However, the original comment also requested that the distribution curve output of the IEUBK lead model be included with the results. The response does not indicate that the distribution

curve output of the model will be included. Please also include the distribution curve output of the IEUBK lead model with the results.

16. **Tables 2.1 - 2.6.** As requested in the original comment, footnotes defining the data qualifiers will be added to these tables. To clarify the treatment of data associated with duplicate pairs, please provide an explanation of the treatment of duplicate pairs of sample results in Section 2.2.1.1, Data Quality Evaluation.

19. **Tables 3.1 - 3.6:** In Tables 3.1 to 3.6, EPC values are identical for both the CTE and RME, as they should be (see response to Navy comment no. 7). The purpose of these columns in this RAGS D-type table is to identify the concentrations actually used for the CTE and RME risk calculations. However, Navy used the arithmetic mean concentration as the EPC for CTE calculations for both soil and groundwater. If the arithmetic mean concentration is used for calculating risk, it should be identified in the EPC columns. The fact that Navy's contractor put the correct values in the EPC columns, suggests that they knew that these concentrations were those that were supposed to be used for both the CTE and RME calculations. Another example of incorrect use of these tables is the fact that the maximum concentration was identified as the EPC for several chemicals in groundwater in Table 3.6, but these maximum concentrations were not used in the risk calculation tables. For instance, the maximum detected concentration (5E-01 ug/l = 5E-04 mg/l)) of chloroform in Table 3.6 was identified as the EPC for both the CTE and RME. However, the concentration actually used (in Table B-37) for calculation of risk was 8.01 E-04 mg/l for the RME and 1.1E-03 mg/l for the CTE. The latter concentration is the average groundwater concentration from Table 3.6, not the maximum as stated under the EPC columns of Table 3.6. These spot checks and the incorrect use of average concentrations indicate that many of the EPCs identified in the EPC columns of Tables 3.1 to 3.6 were not actually used in the risk calculations. Tables 3.1 to 3.6 should be revised so that the concentrations in the EPC columns are those actually used in the CTE and RME risk calculations. As mentioned in the response to Navy comment no. 7, only the RME risk calculations for groundwater need to be revised since remedial decisions will be based on RME risks.

30. **Attachment B:** Evaluation of some responses to comments will require review of the final HHRA. Discrepancies associated with the central tendency intake calculations were found in the original review of the HHRA. Any corrections to these calculations will require review when the final HHRA is issued.

31. **Table B-42:** As in the Response to Specific Comment 30, the corrections associated with the averaging time used in Table B-42 will require a review of the final HHRA.

Draft Screening Level Ecological Risk Assessment

The Navy disagrees with several suggestions for additional or alternative analyses based on the argument that the approved final work plan did not include such analyses. The Navy response to some other suggestions is that the issue raised by the comment "may be discussed" as part of the Phase II RI. EPA reiterates that the results of the draft screening level ecological risk assessment indicate that screening level sediment concentrations exceed ERL benchmarks; therefore, a baseline ecological risk assessment may be required under CERCLA to determine whether these potential risks are significant.

Although the Navy response to NOAA comment No. 3 supports the conclusion that contaminant concentrations have diminished appreciably since 1990, the available 2001 sediment sample data indicate that ERLs are exceeded by arsenic, copper, lead, nickel, chrysene, fluoranthene, pyrene, DDT, and PCB. According to the Navy response to NOAA comment No. 3, the Navy is not convinced that a baseline ERA for the sediment is appropriate because the screening level HQ values are less than 10, the area of sediment is small, and natural attenuation may be occurring. These arguments have some merit, but they should be discussed further as part of the Phase II RI, along with the comments identified below that for which the Navy has deferred further discussion.

General Comment 2. The original comment cautioned that not using adequate literature BCFs for dioxins/furans might underestimate ecological risk. The response (also the response for Specific Comment 22) states that using the BCF of 1.59 for 2,3,7,8-TCDD would not alter the SLERA results, as the HQ for the robin is already greater than 1.0. This is an accurate response; the reviewer calculated an HQ of approximately 4 for dioxins for the robin using BCFs of 0.009 for plants and 1.59 for invertebrates, and the life history parameters provided in the report. It is also recognized that the HQ for the red fox is so low that a revision in the BCF would not alter the results of the SLERA. For the record, however, the source referenced in the original comment does provide soil-mammal BCFs for dioxin compounds, contrary to the response.

EPA Response to Navy comments 3, 4, 5, 8, 13: The response notes that the Work Plan did not mandate this assessment. It is recognized that the Work Plan did not mandate this work. The Navy further states that the particular issues raised by these comments "may" be discussed as part of the Phase II RI. We suggest that this discussion must occur (rather than may occur) before EPA can agree that a baseline ecological risk assessment is unnecessary.

Encl 3